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A DIGEST OF THE ENGLISH LITERATURE

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In the last three years, the neurologists and psychiatrists of the United States have viewed with interest the reports that have come to us from abroad regarding the remarkable war neurosis, shell-shock. While these papers excited our interest, it was not until our country entered the war that the problem became one that demanded our serious attention. At the present time, however, we ought to be fully acquainted with the data already accumulated by foreign workers in the three years of war; to be able to give successful treatment in the many cases that are sure to arise in our armies and, vastly more important, to gain a clear insight into the condition so that we may be able to exclude from our draft army at the time of enlistment the men most liable to shell-shock, and thus prevent "the wastage of the recruiting office," which has been such a burden to the European countries.

Moreover, the importance of the problem cannot be overemphasized. Osler,[1] in a recent communication, speaking of the neurasthenic as he appears at the recruiting station, says that the unfit should be checked at the recruiting office and kept at home; "the trenches is no place for a man with unstable vasomotors. In the strain of war they break like dry twigs and become a heavy burden in the hospitals and convalescent homes."

* Read at the staff meeting, Boston Psychopathic Hospital, Oct. 17, 1917. The contents of this paper are based on observations made in England from May, 1916, to February, 1917, under grant of a Moseley Traveling Fellowship from Harvard University. Indebtedness is acknowledged to Sir William Osler and Dr. Frederick W. Mott for their kindness in making these observations possible.

1. Osler, Sir William: War Wastage: A Note of Warning to Examiners of Recruits, THE JOURNAL A. M. A., July 28, 1917, p. 290.

June 1, 1917, Dr. Thomas W. Salmon, in a letter to the National Committee for Mental Hygiene, wrote from London in regard to the shell-shock cases:

> The extent of these casualties is almost beyond belief. I have not yet had access to the official records, but apparently the neuroses constitute one of the most formidable problems of modern war. These people are certain to go to pieces in the presence of danger or hardship, and are not only useless to themselves but are also a serious drag upon their comrades and the army in general.

When one sees, also, the vast number of these patients collected in England in the various special hospitals devoted to their treatment, one cannot but realize that, if we, in this country, could only prevent such wastage, our work would be of inestimable value to the government. Therefore, in view of the importance of this problem, one feels fully justified in bringing to notice the work already done on the subject by British neurologists and psychiatrists.

SHELL-SHOCK

The term "shell-shock" came into use in the English army the latter part of 1914, but the first reported cases that I have been able to find in the English literature were by Myers[2] in February, 1915. He reported three cases under the term "shell-shock" with loss of memory, vision, smell and taste. He expresses the opinion that his cases "appear to constitute a definite class among others arising from the effects of shell-shock." Even at this early date it was found that the term "shell-shock" was a very loose one, and that many of the patients coming back from France to England in this group had never been "shocked" by the concussion of a shell, but had been buried under débris when the shell exploded; in some cases the patients had never been under shell fire at all. March 27, 1915, the *Lancet*, in an editorial, commented on the effect of shell explosion on the central nervous system, especially in its relation to the special senses, and thought that most cases would fall into one of three classes: fatigue-paralysis, "commotio," or traumatic hysteria. In other words, the numerous cases with protean symptoms of nervous disorder were being

2. Myers: Lancet, London, 1915, **1**, 316.

thought of from the etiologic standpoint, and the neurasthenia and hysteria cases were being separated from those of supposed commotion or concussion with probable organic brain changes due to trauma.

It was not, however, until February, 1916, that we had the first clear classification of the shell-shock cases. Mott,[3] the London neuropathologist, in a series of lectures on "The Effects of High Explosives Upon the Central Nervous System," divided his cases into three groups from the pathologic point of view:

1. The immediately fatal.

2. The wounded with injuries to the central nervous system.

3. The traumas to the central nervous system without visible injury.

The last group, according to Mott, forms the true shell-shock cases. Thus, from the pathologist's point of view, all cases are "commotio" with or without visible injury to the central nervous system. Shell-shock, however, as seen from the practical clinical point of view, includes all functional or obscure neurologic cases. In many cases now grouped as shell-shock, the patients have never been within the zone of active warfare. Henry Head,[4] in a protest against the use of the term "shell-shock," is quoted as having said that it represented "a heterogeneous collection of different nervous affections, from concussion to sheer funk, which have merely this much in common, that nervous control has at last given way. To me it would be just as reasonable to sweep up the various fruits which fall from the trees in a strong wind and then to discuss them without first stating that some fell from an apple and some from a pear tree."

A workable classification from the clinical point of view is that of Buzzard[5]:

1. Pure exhaustion cases. These were quite common in the early part of the war, but are rarely seen now.

2. Neuropaths and psychopaths, who develop shell-shock symptoms very early and quickly.

3. Martial misfits; the "objector," who hates war but goes because he must and often malingers.

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3. Mott, F. W.: Lancet, London, 1916, **1**, 331, 441, 545.
4. Head, Henry: Lancet, London, 1916, **1**, 306 (quotation).
5. Buzzard: Lancet, London, 1916, **2**, 1095.

4. Concussion cases.

5. Cortical injury, a few of which get into the shell-shock group by mistake.

6. Cases of hysteria who show the major and minor symptoms of hysteria as in civil life.

From this brief outline on classification and definition, it can readily be seen that the term "shell-shock" is a blanket diagnosis to cover all the traumas and disorders of the central nervous system without visible injury, occurring in modern warfare. The term is a poor one, and Eder,[6] in his latest book, has used the title, "War-Shock: The Psycho-Neuroses in War." He markedly limits himself, however, by defining, "war-shock" as "hysteria occurring in a person free from hereditary or personal psychoneurotic antecedents, but with a mind more responsive to psychical stimulus than the normal." Such a narrow definition seems to me unpractical, as many cases other than these must be treated as shell-shock in hospitals devoted to the care of the neuroses of the war. An expression much employed lately is "war-strain," but this is lacking in not emphasizing the dominant rôle of the central nervous system. As shell-shock is now so widely used, it does not seem practical to change it. G. Elliot Smith[7] did not use either "war-strain" or "war-shock" in his book on "Shell-Shock and Its Lessons," and preferred "shell-shock" "as a popular but inadequate title for all those mental effects of war experience which are sufficient to incapacitate a man from the performance of his military duties." A new and excellent classification by Hurst[8] is too long to reproduce here. It is, by far, the best one that has been made.[9]

PREDISPOSING CONDITIONS TO SHOCK

It has been found that in a large majority of cases of shell-shock the patients have a neuropathic tendency or inheritance. Some of Mott's patients "gave a history of either previous nervous breakdown or of a timid disposition, easily frightened, emotional, or afraid of the sight of blood; in a few, the fact was

6. Eder: War Shock, London, William Heinemann, 1917.
7. Smith and Pear: Shell-Shock and Its Lessons, Manchester, England, 1917.
8. Hurst: Guy's Hosp. Gaz., 1917, **21**, 109.
9. Mental Hygiene, 1917, **1**, 468.

elicited that they had a fright in early childhood and that this recurred in dreams." In a case reported by Feiling,[10] the boy ran away from school at 13 because he was "tired of it," and also worked at various trades, at none of them apparently with any very marked success. In one of the best of the articles on shell-shock, Forsyth[11] says, "In all cases coming under the writer's notice with symptoms which were more than mild and transitory, a history of some earlier nervous trouble, slight or severe, was forthcoming." In twelve consecutive cases the following notes were elicited:

Nervous breakdown two years before.
Highly nervous and irritable.
Often depressed; worries over things.
Longish periods of depression.
Always been shy; still shy, though middle-aged.
Nervous breakdown four years ago.
Self-conscious.
Very depressed; worries unnecessarily.
Of nervous temperament.
Intensely self-conscious; married, but sexually impotent.
Highly strung and excitable since a child; violent tempered.

Later Forsyth says, "The occurrence of a definite neurosis is to be looked for only in psychopathic individuals, the onset representing the collapse of what is already psychically unsound."

Adrian and Yealland,[12] in a report on 250 cases, say:

There are certain mental abnormalities which are present to some extent in nearly every patient. The majority of patients are below the average normal intelligence as judged by the Binet-Simon scale, and others who are more highly equipped prove to have an unstable history either personally or in the family.

Mott[13] again insists:

Of even greater importance than the extrinsic conditions in the causation of military unfitness from exposure to shell fire are the intrinsic conditions, for if there is an inborn timorous or neurotic disposition, or an inborn or acquired neuropathic or psychopathic taint, causing a *locus minoris resistentiae* in the central nervous system, it necessarily follows that such a one will be unable to stand the terrifying effects of shell fire and the stress of trench warfare.

10. Feiling: Lancet, London, 1915, **2**, 63.
11. Forsyth: Lancet, London, 1915, **2**, 1399.
12. Adrian and Yealland: Lancet, London, 1917, **1**, 867.
13. Mott, F. W.: Brit. Med. Jour., 1917, **2**, 39.

CONDITIONS AT THE TIME OF SHOCK

The conditions in the front-line trenches that put the soldier's nervous system "on edge" and sometimes are the sole factor in causing a war neurosis are intimated in a letter from an English officer to his mother, telling of his first experiences under shell fire:

The shelling all day was awful. Before I had been in the trench three minutes, a bit of shrapnel made a clean cut in my breeches, only scratching the skin. The sights were awful, dead men all over the place, some half buried by shells. The ground and trenches had all been flattened out by our artillery fire, so there was hardly any shelter. I told the men to scratch themselves in with their entrenching tools, but it was simply a case of looking death in the face and waiting to be hit. Never for a moment did I expect to get out alive, as the shrapnel rattled all day long on my helmet, and of course the Boche might have counterattacked at any time. Many men got buried and had to be dug out. It was dreadful to see men's nerves give way and a man of 40 whimpering like a child and crying his soul out. Very catching this disease too, so I had to send him back. I never got into a smaller ball than I did that day, and of course the sights next one made eating impossible. When night came nerves got even worse, and there was hardly a man who was not shivering like a leaf. That day and night was a nightmare. It is the only time I ever felt the sweat of fear, but then it dropped off me in one continuous stream, as I thought in the dark my nose was bleeding.

From the foregoing note one gets a slight idea of active trench warfare. Mott[13] expresses it in this way:

It must be obvious that through all the sensory avenues, exciting and terrifying impressions are continually streaming to the perceptual centers in the brain, arousing the primitive emotions and passions, and their instinctive reactions. The whole nervous system, excited and dominated by feelings of anger, disgust, and especially fear, is in a condition of continuous tension; sleep, the sweet unconscious quiet of the mind, is impossible or unrefreshing because broken or disturbed by terrifying dreams. Living in trenches or dugouts, exposed to wet, cold, and often (owing to shelling of the communicating trenches) to hunger and thirst, dazed or almost stunned by the increasing din of the guns, disgusted by foul stenches, by the rats and by insect tortures of flies, fleas, bugs and lice, the minor horrors of war, when combined with frequent grim and gruesome spectacles of comrades suddenly struck down, mangled, wounded, or dead, the memories of which are constantly recurring and exciting a dread

of impending death or of being blown up by a mine and buried alive, together constitute experiences so depressing to the vital resistance of the nervous system, that a time must come when even the strongest man will succumb, and a shell bursting near may produce a sudden loss of consciousness, not by concussion or commotion, but by acting as the "last straw" on an utterly exhausted nervous system, worn out by this stress of trench warfare and want of sleep.

Forsyth[11] lays special stress on "the ghastly sights of carnage":

> These shake the self-control of all but the very strong, and when, as must often happen, a man sees his best friends killed or horribly mutilated, the anguish of his own feelings may unnerve him beyond control, even though, curiously enough, the effects may not be felt for hours or even days after.

From the psychologist's standpoint, the situation is interesting:

> At the time of the trauma, whether it is concentrated in a few moments or spread over days or weeks, the situation to be met derives its psychical importance from the fact that it involves the risk of death. Against this, the instinct of self-preservation rebels, employing as its weapon the powerful emotion of fear. And this, it is not superfluous to recall, is a natural emotion, and therefore ineradicable; its function, like that of its physical counterpart, pain, is protective, dictating an immediate flight from the danger arousing it. In face, therefore, of the prospect of sudden death, fear strains all its powers to enforce an escape, and it can be coerced only by a still more powerful effort of will.[11]

Just what happens at the precise moment of the shock is best shown by quotations from a few case histories. In one of Myers[2] cases, the patient was not feeling afraid but "rather enjoying it" until the shells burst about him. While creeping under wire entanglements, some shells burst near him. "As he was struggling to disentangle himself from the wire, three more shells burst behind and one in front of him. Immediately after the shell had burst in front of him, his sight became blurred. At the same moment he was seized with shivering, and cold sweat broke out, especially round the loins." Another patient "was blown off a heap of bricks 15 feet high owing to a shell bursting close to him." Pemberton[14] relates the case of a sergeant of a battery of field artillery: "His gun was No. 1. A direct hit was made on No. 2 gun

14. Pemberton: Lancet, London, 1915, **1**, 967.

with a high-explosive shell, killing three men. I saw Sergeant ——— shortly afterward, and although naturally excited, he appeared otherwise normal. He went on working his gun until dawn next day, when he collapsed and was found lying across one of the disemboweled corpses." In Feiling's[10] case, a trench in which the patient was fighting was blown in and he was buried for twelve hours in a mass of mud and débris. Mott[3] gives the history of a captain as follows: "His whole company had been destroyed, and, while talking to a brother officer, the latter had half his head blown off by a piece of a shell." Another patient said: "There was something dropped into the trench. I think it was a shell. I felt myself go up into the air, but I cannot remember falling."

Forsyth[11] gives the following case to show how light trauma may be:

> The patient, after being for some weeks in France, where his battalion was completing its training, spent two nights, which were quiet ones, in reserve trenches. The following day, as his platoon was moving to the rear, a shell exploded close by, wounding several men, but killing none. He himself was unhurt, though he thinks some earth thrown up by the explosion may have struck his right arm. At any rate, on getting back to his billet, he found his right hand was weak, and the next morning he had lost the use of the right arm. When examined three weeks later, the limb was found to be paralyzed and showed marked involuntary movements, which had spread to the shoulder and right side of the neck. No organic cause of the condition could be found. Three months later the movements had ceased, but the arm was still weak.

RESULTS OF SHOCK: SYMPTOMS

1. *Loss of Consciousness.*—Most patients lose consciousness at the time of the shock, but many are only dazed or stuporous. The ones that die are usually unconscious from the time of shock. A condition of automatic wandering, like the fugue of an epileptic so vividly described by Marie, has been observed in some cases. Parsons[15] says, in a typical case "consciousness is lost for a variable time, but often not so far as to prevent automatic movements, so that the man may walk in a dazed condition to the dressing station."

2. *Amnesia.*—One of the most common symptoms of shell-shock is amnesia, or loss of recollection. Very few patients lose consciousness for anything but a short

15. Parsons: Lancet, London, 1915, **1**, 697.

time, and the memory of many of the events during most of the period of trauma may be brought out in various forms of treatment. The temporary amnesia may be very severe and even complete. Mott[3] gives the history of a man who was blown up by a shell and who could not recollect any recent or past events. He did not recognize any coins or even his own written name. He rapidly improved and recovered completely. One of Myers'[16] cases is an example of retrograde amnesia:

A private was found wandering in a neighboring village, clad only in his shirt and socks. "He was unable to give his name, regiment, or number. He thought his age was between 20 and 30. I tried him with various Christian names, but he replied that none of them seemed familiar to him. He could remember two men finding him as he was strolling on the outskirts of a village, and could describe everything that had occurred to him since then. There was no means of identifying him, and his past was a complete blank; he could recall nothing, for instance, of the events of his childhood."

Mott[3] gives another remarkable case, the treatment of which I shall give later in this paper. He writes:

The patient's mind was a complete blank, and this condition was reflected in a dazed, mindless, masklike expression. When asked where he lived, he said, "W——"; he did not know it was in the West Riding. He did not know the address of his home; and when shown a letter from his father with the address on the top, he did not recognize it or his father's handwriting. When shown a photograph of his home, with a group of his father, mother, and three brothers in front of it, he maintained the same wondering, dazed expression, and failed to recognize the nature of the picture. His father had heard from a comrade that he had been buried by the explosion of a shell in the trench; that he had been unconscious for some time and lost his speech.

3. *Motor and Sensory Changes.*—Paralysis and disorder of gait are common symptoms. In 250 cases with some objective disorder, Adrian and Yealland[12] found 37 cases of monoplegia of the arm or leg, 46 of paraplegia, 16 of hemiplegia, and 18 of disordered gaits. The suggestion of an external injury is usually found in the history of these patients. The man who has fallen on his shoulder will have a monoplegia of the corresponding arm. Injury to the back often precedes paraplegia. The reflexes are normal or there may be an increase in knee-jerks with a

16. Myers: Lancet, London, 1916, **1**, 65.

spurious ankle-clonus. I cannot find that a positive Babinski sign has been reported in a purely functional case. The overaction of antagonistic muscles is quite remarkable, especially noticed in relation to gait. Batten[17] relates a case as follows:

> When first admitted and asked to walk, the patient grasped the top of the crutches and pulled the body up by the strength of his arms; he then placed each crutch alternately forward, allowing the whole weight to fall on the advanced crutch, and would advance the legs synchronously with the crutch. Later, when taught to walk in the walking-machine, he would support the weight of the body on the hands, dragging the hindmost leg forward against a resistance produced by placing all the antagonistic muscles into forcible contractions. At a later period he walked without the machine, but with the hinder leg as if it were glued to the ground, from which it could only be moved by the most violent tugging efforts.

The direct opposite of the glued-to-the-ground foot is the dancing tremor, in which the patient walks as if the legs were on springs of coiled wire.

The paralyses differ in no way from the hysterical paralyses of civil life. Extensive paralysis is the usual thing, a whole arm or leg. They are often associated with sensory changes. Myers[18] has made a special study of these, finding various disorders of cutaneous sensibility in about 25 per cent. of his patients. Mott[3] found in severe cases of shock "loss of sensibility to all forms of stimulus, pricking, heat and cold, and touch, also of deep sensibility, pressure of muscles, movement of joints, and bone sensibility to vibration of tuning-fork. Hyperesthesia is even more common than anesthesia, and even the lightest touch gives rise to apprehension and movement of withdrawal in severe cases."

Tremors and coarser rhythmic spasmodic movements are an extremely common symptom. Mott[3] gives an example of a gunner blown up by a big shell who was amnesic for fourteen days. He says: "When I examined him he was sitting in a chair; legs, hands, and jaw were in continuous coarse rhythmical tremors like those of paralysis agitans, which became exaggerated when he was spoken to. Every now and again he starts and looks upward and laterally, as if he feared a shell would drop on him." Fine tremors like those of exophthalmic goiter have been noted, and also

17. Batten: Quart. Jour. Med., 1915-1916, **9**, 73.
18. Myers: Lancet, London, 1916, **1**, 608.

tremors of the intention type; but most of them were coarse rhythmic tremors like those of advanced paralysis agitans. In one of Mott's cases, a former pugilist was terrified by the explosion of bombs dropped by a Zeppelin and "developed a curious tic, which took the form of jerky purposive movements of the shoulders and head, as if to avoid a blow, and facial grimaces such as a pugilist might assume in a fight."

4. *Dreams, Terror and Mental Changes.*—In shell-shock, the patients often suffer from terrifying dreams. These are associated with the manifestations of fear, such as terrified facial expressions, cold blue hands, feeble pulse and respiration, sweats and tremors. These dreams often take on the form of nightmares, during which a soldier will go through the pantomime of some terrible experience at the front. I have seen men stand up in bed, sweating and pale, continually shouting epithets at the invisible enemy, go through the pantomime of a charge "over the top," and a hand-to-hand or bayonet attack on the enemy. Mott[3] gives a case as follows:

A captain, aged 20, was admitted under my care in a state of restless delirium; he moved continually in the bed, sat up, passing his hand across the forehead as if he were witnessing some horrifying sight, and muttering to himself; yet, when interrogated, he answered quite rationally. This motor delirium I associated with the continuous effects on the conscious and subconscious mind of the terrible experiences he had gone through.

Sometimes the terror leads to mania:

A young man, aged 19, was admitted, suffering with shock due to emotional stress and shell-fire. He suffered with terrifying dreams, and after he had been in the hospital a short time, he developed sudden paroxysmal attacks of maniacal excitement. One afternoon he had been helping as usual in the kitchen, and then he went and lay down on his bed and apparently went to sleep; he suddenly awoke with a startled, terrified look, became flushed in the face, sweated profusely, and made for the door as if to get away from some terrifying conditions. He was restrained with difficulty. He remained in this excited state, glaring rapidly from side to side, giving one the impression that he was suffering from terrifying hallucinations of sight and hearing, although he would make no response to interrogation. He did not recognize his wife, the doctors, or the sisters. Once when I, accompanied by two medical officers in uniform (strangers), came up to speak to him, he became violently agitated, as if some terrifying conditions had been aroused by the sight of the

uniforms; the face was flushed and he sweated so profusely that the perspiration dripped in a stream off his nose. The attacks would last from a few hours to a few days; they came on quite suddenly, like an epileptic fit, and often without any apparent cause. It may be mentioned that there was no obtainable history of epilepsy or insanity in the family. The case rather suggests the psychic equivalent of epilepsy in the attacks.

Mott noticed other points of interest in his patients. Many complained of a falling or sinking feeling; often in their dreams, patients were heard to cry out and would awake to find themselves in a cold sweat; some officers gave commands to their men and urged them on to battle; and some performed the pantomime of raising the gun to the shoulder and pulling the trigger.

The revival of old associations in shell-shock dreams is not uncommon. In one of Mott's cases, the patient would dream of meeting a leper in a mine passage. He had been alarmed previously by a leper in a South African campaign. A single predominating incident may be repeated again and again in these terrifying dreams. A soldier who had seen a legless body of a comrade at the front had many dreams in which a legless body was always the central figure.

5. *Special Sense Disturbances.*—(*a*) Vision: The usual disturbances are photophobia, with or without blepharospasm, "smoky vision," diminution in the visual fields, and amblyopia. The photophobia is not usually a serious or persisting symptom; "smoky vision" may last for months. Diminution of visual fields alone is common. Patients with amblyopia usually go to special hospitals. The first and best cases recorded are those by Parsons[15] early in 1915. Functional blindness is more common than deafness, loss of smell or taste. "On examination, it is found that there are intense blepharospasms and lacrimation. The lids are opened with great difficulty, and examination of the eyes is almost impossible in the early stages." The man is struck blind instantaneously. In two to three weeks blepharospasm diminishes. "The fundi appear to be absolutely normal. The pupils react to light, though in some cases the reactions are sluggish, and sometimes one pupil differs from the other, being larger or more sluggish in its reaction. By this time probably some restoration of sight has occurred, light is perceived and large objects may be

distinguished. As improvement occurs, the patient manages to grope about, usually with his hands outstretched before him, but it is noteworthy that he does not usually stumble against objects in his path. As soon as it is possible to take the fields of vision, it is found that they are markedly contracted, and that indeed to a degree which seems scarcely consistent with the avoidance of obstacles in walking. The recovery of vision is slow, but eventually it always seems to be complete."

In Pemberton's[14] case which I mentioned before, of the sergeant who suddenly collapsed twelve hours after seeing the gun-crew next to his hit, the amblyopia and contraction of fields was marked when first seen. There were many sensory and motor disorders, also.

(*b*) Speech: The speech defects most commonly noted are mutism, aphonia, stammering, stuttering and verbal repetition. Mutism is most common—about one in twenty, according to Mott. The patients cannot produce any audible sound; there is no sound when they attempt to laugh, try to whistle or cough. Most of these patients can write. "Many who are unable to speak voluntarily call out in their dreams expressions they have used in trench warfare and battle. Sometimes this is followed by return of speech, but more often not." Mott[3] continues, "This mutism is due to emotional shock; it is a psychic rather than physical trauma, in my judgment, for it in no way differs from the description of hysterical mutism thus given by Bastian." Anesthesia of the pharynx has been noted. Some cases will be quoted later, in the consideration of treatment.

(*c*) Hearing: Deafness often accompanies mutism or aphonia, causing the condition of functional deaf-mutism. "It is not at all infrequent for a man to be deaf on one side and not the other, and the history often shows in these cases that a shell has burst on this side of the man. Auditory hallucinations are not uncommon, and the patients complain of hearing the bursting of shells, of the noise of shells coming, of bullets whizzing, and of whistles blowing. Hyperacusis, or extreme sensibility to sound, is a common and very troublesome symptom, making the patient miserable and apprehensive." Mott found that many relapses occurred during a Zeppelin raid (on London), and one man, "a sergeant who had been a professional

pugilist of great renown, suffered extremely, so that the noise of the click of billiard balls irritated him to such a degree that he would protest forcibly against the game continuing. His fellow patients found that they could easily cause him to flee by taking their slippers off and banging them on the ground sufficient to produce a sharp loud noise."

(*d*) Taste and Smell: Both are often affected, but owing to the difficulty of an examination which is so largely subjective, they are often omitted from the case reports. No very definite data could be obtained about them.

6. *Cardiovascular.*—"Patients often complain of palpitation, breathlessness on exertion, and precordial pain. There may be physical signs of dilatation and tachycardia. The pulse is often small and increased in frequency; the blood pressure is never high. It was often below 110, and never above 135. The hands are frequently blue or mottled and cold; and often there is cold, clammy sweating of the palms. The surface temperature may be very low; in one case it was only 16 C." (Mott[3]). Most of the patients with marked cardiac symptoms go to special hospitals. The complaints of these patients are: breathlessness, pain, giddiness, palpitation, and exhaustion on exertion. There are no physical signs of structural change in the heart. These are the cases of "irritable heart" that have received so much attention by Dr. Thomas Lewis and his colleagues at the Military Hospital, Hampstead, England.[19] In the broad sense these cases come under "shell-shock," as they are certainly functional disorders of the nervous system that are peculiar to modern warfare.

The vasomotor conditions are quite noticeable. Osler mentions the "men with unstable vasomotors" as unfit for the trenches. Excessive flushing and dermographia are quite commonly seen.

Headache is often a prominent symptom. Mott[3] says:

> The commonest situation for the maximum pain is the occipital region and the back of the neck; it is often described as a tight compression, like a helmet—the helmet of Minerva. The pain may be in the frontal region over one or both eyes, over the vertex, in one or both temples, or at the back of the eyes. The pain is variously described as burning, stabbing, or

19. Heart, 1917, **6**, No. 4.

a heavy, dull, dizzy feeling, a feeling like a tight hat, or a red-hot wire being run through the temples. It is worse at night, especially upon lying down and trying to sleep.

NEUROPATHOLOGY

The neuropathology of shell-shock has received scant attention in the literature except for the work at Dr. Mott's laboratory. The reasons are quite obvious, as very few patients died at the hospitals except by chance of intercurrent disease, and those that die on the field are seldom examined postmortem. In the last year, however, more provision has been made for necropsies at or near the front, and by arrangement with the Royal College of Surgeons, London, certain brains are being sent back, properly preserved for future study. Dr. Mott[20] has been fortunate enough to secure a few of these, and his findings are of great interest. He first noticed the marked similarity between the brain of a soldier dead from shell-shock and the brain of a man dead from carbon monoxid poisoning. His study of carbon monoxid poisoning before the war led him to think that the main postmortem findings were extensive capillary hemorrhage in the brain, especially in the corpus callosum, the internal capsule, cerebral peduncles and centrum ovale.[21] Two cases were from carbonyl of nickel works. There was a case of suicide by illuminating gas. In the first case of shell-shock, a man had been buried by a shell blowing in a parapet, and had died two days later. No visible wounds were found on the body. Throughout the white matter of the centrum ovale, and especially in the corpus callosum, were multiple punctate hemorrhages. Mott[3] says: "This appearance to the naked eye corresponds to that which I have described in carbon monoxid poisoning. The same microscopic appearances were observed as those seen in coal gas (CO) poisoning, only the hemorrhages were more extensive." Apparently the fatal cases are the gas cases, as Mott has found the same appearance in later brains. These are the true cases of shell-shock with burial that form a very small part of the vast number of cases in men who return from the front with symptoms of a neurosis. Whether these also may have minor brain hemorrhages is prob-

20. Mott, F. W.: Lancet, London, 1916, **1**, 331, 441, 545; Brit. Med. Jour., 1917, **1**, 637.
21. Mott, F. W.: Arch. Neurol., 1907, **3**, 246.

lematical, but we may feel certain that many men who never got within the range of shells and yet develop brain symptoms probably have no such gross pathologic lesions. Most neurologists believe with Wiltshire[22] that "chemical poisoning by shell gas cannot be more than an exceptional cause of shell-shock."

TREATMENT

The treatment of the war neuroses naturally divides itself into a number of separate fields. One may treat the symptoms, at the same time paying attention to the general health of the patient. This method is the one generally used in the British hospitals. But some authors believe that we must go deeper than the treatment of symptoms and make a study of the underlying mental condition that enables a "fixed idea" to develop. The latter form of therapy leads us to the large question of psychanalysis and its place in the treatment of shell-shock. Laying this aside for a moment, I shall take up the treatment of the symptoms.

Adrian and Yealland[12] say that the three principles involved in those methods of treatment that aim only at relieving the functional symptoms are: (1) suggestion, (2) reeducation, and (3) discipline. "The aim of suggestion is to make the patient believe he will be cured, and to lead him on from this to the belief that he is cured." These authors have obtained the best results by:

> A very brief suggestive treatment followed by rapid reeducation, which is continued, if possible, without a pause until the normal function is entirely regained. The suggestive treatment may take any form, but it is essential that the patient should be convinced that it will produce an immediate recovery. In untreated cases there is rarely any difficulty in this, and the conviction can be strengthened by using a form of treatment which will be capable by itself of evoking some part of the function which is temporarily in abeyance. For instance, a case of mutism may be cured by tickling the back of the mouth so as to induce reflex phonation. The patient is compelled to make a noise, and the fact that he has done so will convince him that the treatment will be effective. In the same way, a strong electric stimulus will produce a sensation and motion in a limb which is supposed to be anesthetic and paralyzed, and this in itself will be enough to convince the patient that he is on the road to recovery.

22. Wiltshire: Lancet, London, 1916, **1**, 1207.

The application of strong electricity by the faradic current is a very successful method of augmenting suggestion. Of course, the secret of success lies in the fact, as these authors point out, that "the patient must be convinced that the physician understands his case and is able to cure him. This idea should be fostered from the moment the patient enters the ward." Many treatments have failed because of a lack of confidence of the operator in himself. The physician's authority must be absolutely unquestioned, and "an air of complete assurance is far more convincing than the most elaborate reasoning."

Hypnotism is a form of treatment under the head of suggestion. It is very easy to hypnotize most patients lightly, according to Adrian and Yealland:

> They will readily accept the idea that they cannot open their eyes or move their limbs, and they will comply with any suggestion which does not relate to their disability. Unfortunately they are not nearly so tolerant when the suggestion touches their fixed belief that they cannot speak or that their legs are paralyzed. With a patient who is intelligent and anxious to get well, hypnotism may be extremely successful, and it is certainly of great value in the treatment of subjective troubles such as insomnia, fighting dreams, etc."

Myers[16] reports that in twenty-three cases he had apparently complete cures in 26 per cent., and distinct improvement in 26 per cent. He failed to hypnotize 35 per cent., and found no improvement after hypnosis in 13 per cent. He says that it "invariably proved of great assistance toward recovery." Eder[23] found that out of seventy-eight patients only three could not be hypnotized at the first attempt, and says that "hypnotism has been most successfully applied in the treatment of our soldiers." Buzzard[5] sums up the subject by saying:

> My experience leads me to believe that any form of suggestion, whether applied under normal conditions or under the influence of anesthetics or hypnosis, may be successful; but the success depends first of all on the willingness of the patient to recover, and secondly on the adequacy of the suggestive stimulation.

Strong suggestion in the excitement stage of ether anesthesia has been tried, and has been successful in certain cases of mutism and loss of hearing.[24]

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23. Eder: Lancet, London, 1916, **2**, 264.
24. Dawson: Lancet, London, 1916, **1**, 463. Proctor: Ibid., 1915, **2**, 977.

O'Malley[25] has been very successful in his cases of aphonia and deafness by treatment with suggestion and reflex excitation.

The second principle of treatment outlined by Adrian and Yealland is reeducation. Under the heading of reeducation they include the method of simple persuasion, in which the patient is convinced by logical argument that his condition is not so serious as he supposes. However, it is not easy to convince a patient that his trouble is purely mental when he has physical symptoms and he naturally looks for a cure by physical means. Electricity is the best and the most mysterious to the layman of the physical means which we have at our command.

While reeducation by physical means is a valuable adjunct to treatment, occupation plays a very important part. Drills and physical exercises should be replaced by productive occupations as soon as possible. Those which are nonproductive should be avoided. All occupations, and especially those carried on by patients seriously incapacitated, should be regarded merely as steps in the process of their education. Constantly more difficult tasks should be assigned as a means toward the restoration of the lost or impaired function.

The third form of treatment is by discipline. Isolation is often used. It may supply "the needful stimulus to recovery by making the patient's illness a dreary and unprofitable business, instead of a source of pride and satisfaction. For this reason it is extremely useful in cases of functional tremors and pseudochorea, where the patient becomes quiet as soon as he is deprived of his audience."[12]

The details of the treatment of various symptoms as carried out by Adrian and Yealland cannot be gone into. The essential elements consist in a very brief suggestive period followed by rapid reeducation. The self-confidence of the physician, the faith of the patient, and the rapidity of operation are all important factors in the method of treatment.

Other methods of treatment consist in the emphasis being placed on the general condition of the patient. This is Mott's method of procedure, and it certainly has been very successful in his hands. He[3] says, "Only common sense and interest in the comfort, welfare,

25. O'Malley: Lancet, London, 1916, **1**, 1080.

and amusement of these neurotic patients are necessary for their recovery." He lays special emphasis on the hospital and its environment. At his beautiful institution outside of London, he has:

> Light airy wards, and day rooms for meals and recreation, plenty of single rooms for the isolation of cases that are troubled with noises or require special attention; and especially valuable are the baths, so that every soldier can get a warm or cold spray bath every day. The warm baths, and especially the continuous warm baths, are especially valuable for promoting the action of the skin, of relaxing the tired muscles, and by the soothing influences helping to induce sleep, so that less hypnotics are required to be employed.

In these ideal surroundings the patients are usually left to adjust themselves.

When indicated, mild suggestive and persuasive measures are used, as in the case of amnesia partly quoted. The story continues as follows:

> We heard from his father that he was a good musician, and I said to him, "G——, I hear you are a good musician," and I asked him if he could play the piano or sing; there was the same wondering, bewildered look, and he muttered something which was to the effect that he could not sing or play. Three days later I said, "Come, you can whistle 'God Save the King.'" He took no notice, but upon pressing him, he looked up and a glint appeared in his eyes, and he said "You start me." I whistled the first bar; he took it up and whistled it admirably. I then asked him to whistle "Tipperary," but he could not do it till I started him, and the same with several other tunes, but once started, he had no difficulty, and I recognized from the admirable intonation that he was, as his father described him, an excellent musician. I could not, however, that day get him to start upon his own initiative any one of the tunes he had whistled. The next visit, three days later, I observed that his expression had changed. He smiled when I spoke to him, and I recognized clear evidence of a mind that had partly found itself. He could not whistle by himself any of the tunes I had previously started him on when I called for them. [He relearned to play the piano by first having his finger held on the keys and a melody played.] The next time I came, he was able to play any music set before him. His associative memory and recollection of music were in advance of other associative memories. Thus, eight months after he had recovered his musical memory, he had very imperfectly recovered his memory of elementary facts regarding his profession as a land surveyor, and there was still a tendency to a vacant, mindless expression and prolonged reaction time as shown by delay and slowness in responding to questions,

as if there were a difficulty in linking up the necessary associations.

Mott reports that about thirty-five cases of mutism have come under his observation, with recovery in all. Some of the recoveries take place under most amusing circumstances:

In one case the patient "was sitting in his wheeled-chair playing baseball, at which he was quite good, when a runner overturned him; the sudden emotional shock and surprise made him exclaim aloud, and since then he has quite recovered speech." Strong faradic stimulation to the larynx in this patient had not resulted in phonation. Another patient "was in a punt and it was turned over, and he was capsized into the water, which made him shout out. Practically, he had been mute for more than eight months. He often shouted words in his sleep about trench warfare, so he must have had dreams but forgot them." This patient under the strong suggestion of removal of adenoids did not speak. In regard to a third patient, the following is told: "His fellow soldiers thought he ought to hear and speak, and they adopted energetic measures to make him shout out for help. Two of them leathered him with a slipper and then nearly throttled him. He struggled and shouted 'Stop it.'"

One dreamed he was falling over a cliff, shouted out, and recovered his speech. A deaf-mute was heard to speak in his sleep. He was told of it by a comrade. He said, "I don't believe it."

Mott's summary of treatment is as follows:

Be cheerful and look cheerful is the note that should ever be sounded to these functional cases. Sympathy should not be misplaced, although it should be shown to all these poor fellows who have a fixed idea of never recovering; it is not their fault, it is a real thing to them, and no one could be more grateful than these cases of functional nervous disability for cheery words. I use many of these cases that have recovered as object-lessons. I do not find hypnosis or psychoanalysis necessary or even desirable."

Forsyth[11] thus outlines his treatment:

The only treatment during the acute stage comprises three items—physical rest in bed, mental quiet, and good food. A private room is best. "Noises of all kinds, indoor and out, are borne with intolerance and are harmful, especially if they are unexpected and even remotely recall the dreaded shell explosions." At first the patients should be left to themselves, without being disturbed by the taking of medical histories or conversation. "They must expect to pass restless nights with piercingly vivid dreams, for which even hypnotics are only palliative. Those with the mildest symptoms

can safely be allowed to get up within a few days, gradually increasing this exertion, until perhaps in a week or a fortnight they can get away to the quiet of the country or the seaside; and in another six weeks they will probably be able, not indeed to return to the front, but to take up light duties at home."

Most patients need bed for three to four weeks or longer, followed by two or three months of quiet living. "Throughout the greater part of convalescence any indiscretion in the way of mental or physical exertion beyond the narrow margin of the patient's endurance at the time seems regularly to entail a setback out of all proportion to the extra effort."

The symptoms of depression of spirits, listlessness, taciturnity, desire for solitude, lack of confidence, poor appetite and sleeplessness are "best and most quickly relieved when the patient has been induced to talk freely of what is on his mind, the opportunity at the same time being taken to present his facts to him in their true light, together with the additional information he needs to form a just opinion of his conduct and to rehabilitate himself in his own esteem." Forsyth looks at the neurotic symptoms as in a case of everyday neurosis, a problem dealing with "the psychical development of the patient since childhood; and the further treatment must follow psychanalytical lines." A patient who has not been able to regain his self-control after three or four months is in need of extraneous help, that is, psychotherapy.

Rows'[26] treatment is along nonradical lines. He says that the patient's difficulty lies chiefly in the fact that:

> He has little or no insight into the nature and mode of origin of his mental illness. This insight can be provided by explaining to him in plain language the mechanism of simple mental processes, by enabling him to understand that every incident is accompanied by its own special emotional state and that this emotional state can be reawakened by the revival of the incident in memory. The patient will thus be led to see that it has been no gross disease and no supernatural agency which has disturbed him; he will be able to recognize the relation of cause and effect in the origin and development of his illness. When this relation is appreciated, both the patient and the physician will begin to realize that they have some ground in common. The physician should be prepared to give at least an hour for an interview, and in most instances several interviews will be necessary.

26. Rows: Brit. Med. Jour., 1916, **1**, 441.

The value of psychanalysis as a form of treatment has caused much controversy in England. Adrian and Yealland[12] believe it to be very valuable as a form of treatment for the state of mind of the patient which has allowed a fixed idea to develop. The fixed idea itself that gives rise to the functional symptom or paralysis, loss of speech, etc., is best treated by suggestion, but at the basis of this is a state of mind that will not vanish by these methods. They say that the patient minus his symptoms "will always be liable to develop hysterical troubles in moments of emotional stress and exhaustion, just as a man with a malformed chest will be liable to attacks of bronchitis." This is borne out by the number of patients returned from the front with a remission of symptoms after apparent recovery. Psychanalysis, in their opinion, will "cure not only the hysterical symptoms but also the hysterical mentality." If the repressed desire is "unearthed and explained to the patient, the repressed conflict will vanish, and with it not only the hysterical symptom but also the state of mind which made this symptom possible." Practically it takes too long a period to use psychanalysis on the average shell-shock patient, and it can be used only in special hospitals. One must therefore treat symptoms during the war and leave this longer method for more leisure moments.

Eder[23] also thinks psychanalysis valuable but not usually expedient in war time. He, however, uses it "for purposes of diagnosis or with a view to helpful suggestion in most cases."

One of the most important problems in the early part of 1915 was the question of sending the apparently cured patients back to the front. Those that went back proved useless as soldiers in front-line trench duty, for they broke down again either on the way to France or soon after reaching the trenches. Forsyth's views are that "with an increasing experience of these cases a very strong doubt rises as to the judiciousness of sending any cases of nerve-shock, with few exceptions, back to the firing line." If the patient knows he will not return to trench warfare, he makes a more rapid recovery. Forsyth thinks that these patients should be kept in England on light duty because of the following points:

1. Their untrustworthy memory (one of the last symptoms to disappear), by leading them to forget to

carry out orders or to forget when they have carried them out, may entail the miscarriage of plans.

2. Their example may infect those around them with irresolution or even worse.

3. When the strain becomes severe, they will almost certainly break down a second time.

The hospital building and its surroundings are important in the treatment of war neurosis. The English War Office has arranged two exceptionally fine hospitals for officers,[27] one on a quiet street in London, of thirty-three plain bedrooms with gray walls, without pictures or ornaments. Here the patients are received from France and given from three to four weeks of a modified Weir-Mitchell treatment of absolute rest in bed in quiet surroundings. When somewhat recovered, they are removed to a large country house, where they remain for six weeks or longer and receive the treatment that has been outlined above.

For the soldiers a complete series of hospitals has been inaugurated.[28] There are two "clearing hospitals" of 500 beds for all neurologic patients, including those with functional paralysis, disturbances of speech, amnesia, mutism, deafness, amblyopia, motor agitations, nervous debility, mild neurasthenia, simple mental confusion, anxiety psychoneurosis, simple mental depression, etc. The treatment here consists of rest, proper feeding, massage, electricity, baths, psychotherapy, simple suggestion and occasional hypnosis. From these two hospitals about 40 per cent. return to light duty, 20 per cent. are invalided, and 20 per cent. are transferred to special institutions.

Of these special institutions there are two of about 550 beds, mostly with single isolated rooms. No new patients are sent here, but only those transferred from the neurologic hospitals. Here are treated severe neurasthenia, mild psychoses, profound amnesia, epilepsy and mild primary dementia. The treatment consists of rest, proper feeding, recreation and massage. Psychanalysis is used in selected cases. About 40 per cent. of these patients return to light duty.

There are also two hospitals of 700 beds for certificable mental patients. From 10 to 15 per cent. of these return to light duty.

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27. Lancet, London, 1915, **2**, 1155.
28. Turner: Lancet, London, 1916, **1**, 1073.

PROPHYLAXIS

What can the Medical Corps of the United States Army do toward the prevention of shell-shock? Obviously it must be checked at the recruiting station or in the cantonment camps before the men leave for France. There ought to be no question in the minds of the medical officers as to the advisability of checking this condition at the source, for no one who has seen the results of modern warfare on the unstable mind can do otherwise than urge such measures with his utmost vigor. It becomes the duty of each medical examiner to weed out from the recruits such men as are liable to shell-shock. By so doing, an enormously important advance will be made in our army, as judged by the experiences of the other armies of the Allies.

We have been strongly advised by Osler to check the enlistment of the neurasthenic. It is obviously difficult to pick him from the crowd, "as he may come up in good form" and be eager to go overseas. But it is not so difficult with the mentally deficient, the "queer stick," the "boob," and the butt of the practical jokers. He is soon observed and noted by both officers and men, and if he is singled out and talked with for five or ten minutes one ought to have no difficulty in deciding his fitness for active trench warfare. One ought also to look especially carefully into the past history of the depressed, the man who worries unnecessarily, the self-conscious, the shy, the high-strung, excitable man, the violent-tempered, the nervous, the timorous, the easily frightened, or the neurotic individual. Any or all of them may make poor first-line-trench soldiers. The task is a difficult one, but that in itself should not prevent our trying. What an advantage it would be to our army officers, and what a saving of life it would mean to our men, if the shell-shock patients could be eliminated from our forces that will fight overseas! Such utopia is probably impossible, but I feel confident that careful weeding out of the mentally unstable will certainly greatly reduce the numbers of shell-shock cases that are bound to appear in our casualty lists.